Foster, A. P. (2016). What's new in caprine dermatology? *Goat Veterinary Society Journal*, *32*, 74-78.

What's new in caprine dermatology?

Taunton racecourse, October 2015

Aiden Foster
Farm Animal Pathology Service, School of Veterinary Sciences, University of Bristol, Langford House, BS40 5DU

INTRODUCTION

Skin problems in goats have long been a challenge to their owners and vets. I presented a talk on goat skin problems to the spring meeting of the Goat Veterinary Society, held in Leicester, back in 2010. Since that time there have been some developments in our understanding of caprine skin problems. The aim of this article is to provide an update on selected topics in caprine dermatology. I have reviewed selected articles and material published by the Animal and Plant Health Agency (APHA) published since 2010.

When considering zoonotic skin conditions that may affect goats I consulted the Zoonoses report (2013) published by Defra and PHE[1] which includes the following information on numbers of livestock. Although goats have always formed a small part of the national flock/herd they remain highly valued by their owners whatever their use (dairy, meat, pet).

Number of livestock in the UK in 2013

	England*	Wales**	Scotland***	N. Ireland†	UK
Cattle	5,364,000	1, 094,644	1,797,322	1,625,446	9,881,412
Sheep	14,922,000	9,460,692	6,570,611	1,968,872	32,922,175
Pigs	4,066,000	24,890	319,396	426,900	4,837,186
Poultry	120,504,000	8,736,547	14,693,992	19,128,094	163,062,633
Goats	80,000	10,475	3,966	3,133	97,574
Farmed Deer	22,000	1,007	6,234	3,064	72,305
Horses	194,000	50,381	37,117	12,007	293,505

Data sourced via the Radar Veterinary Surveillance database (Defra)

* obtained from the June 2013 England Agricultural Census

The importance of skin disease in goats is reflected in welfare studies. A review of welfare issues in goats, in Norway, reported that "The most prevalent physical conditions observed were ocular discharge, skin lesions, udder asymmetry, calluses on knees and hocks, and overgrown claws" (Muri et al. 2013). This corroborates the findings of an earlier review of goats in the UK where the main welfare issues were lameness and claw overgrowth, udder and teat lesions, skin lesions and pruritus (Anzuino et al. 2010).

DISEASES OUTSIDE THE UK

Defra publish information on diseases of livestock as part of their International Disease Monitoring activities. The reports of Bluetongue Virus infection in France in cattle[2] are a reminder of the

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/447771/pb13987-zoonoses-report-2013.pdf Accessed 25/10/2015

[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/463634/poa-update-btv8-france.pdf Accessed 25/10/2015

potential risk that infected livestock from Europe may pose to the UK through the importation of goats. While clinical signs may not always be apparent when goats are infected this depends on their immune status and the strain of virus. Clinical signs may be similar to those seen in sheep.

Goats are also susceptible to Peste des Petit Ruminant (PPR) – a disease that has been called "Goat Plaque" and reported in a number of countries including China.[3] There has been an international call to eradicate PPR in sheep and goats. For a review of this condition in sheep and goats see Parida et al. (2015).

A report of seroconversion of cattle in Eire to besnoitiosis has shown the susceptibility of cattle to this emerging protozoal disease. APHA has published an advice leaflet which gives an overview of the disease which is well recognised in Europe where infection seems to have spread in recent years.[4] While interest in this disease has mainly focused on its impact in cattle there are other species that can be affected, including goats. Studies of the pathological response of goats to experimental infection have demonstrated that infection in goats can undergo a similar course to that seen in cattle (Oryan et al. 2014). In the acute stage of infection goats may develop oedema, hyperaemia and orchitis. There may be lameness with arthritis and ocular signs with photophobia and lacrimation. In the chronic phase of the disease the skin can become markedly thickened, alopecic, lichenified and hyperpigmented. Tissue cysts may be observed in the sclera and conjunctiva; they are also readily found in other tissues and especially the skin. The pathological changes observed in a skin biopsy can help to raise suspicion of infection.

CONGENITAL

Epidermolysis bullosa (EB) is a group of mechanobullous disorders involving defects in the basement membrane zone (BMZ) and the keratinocytes in the stratum basale that are characterised clinically by blistering and erosions following minor trauma. In humans EB is classified into three major types: epidermolytic (EB simplex, EBS), lucidolytic or junctional EB (JEB) and dermolytic or dystrophic EB (DEB). EBS is characterised by intraepidermal blistering; JEB by blister formation at the level of the lamina lucida and DEB by blister formation below the lamina densa. These disorders are rare in domestic animals and their pathogenesis is poorly understood compared with the studies of the human counterpart. There are genetic mutations in structural proteins in the cytoskeleton of keratinocytes and the BMZ that lead to the various forms of EB (Medeiros and Riet-Correa 2015).

Clinical signs of EB are usually manifest shortly after birth when intra-oral lesions including ulceration and erosions may be seen on the tongue and palate associated with suckling. One distinct feature is dysungulation where the hooves are shed. Affected animals are moribund and so are usually euthanized early on. Characterization of EB requires light microscopy and ultrastructural evaluation with electron microscopy (EM); immunofluorescence and molecular genetic studies may enable the genetic defect to be determined. EB has been described in cats, dogs, mice, rats, cattle, sheep, horses and in recent years in goats.

Medeiros and colleagues (2013) describe a study of DEB in a group of Anglo-Nubian cross-bred goats. The clinical signs included extensive oral ulceration of the palate, gums and tongue. There was dysungulation and alopecia; with ulceration and erosions, of the pinnae, dorsal aspect of the carpal and tarsal regions, and ventral aspect of the thoracic and abdominal regions. The Nikoloskiy test was positive – this is where the skin is gently rubbed and in affected animals the skin will readily form a blister. Breeding studies demonstrated an automosal recessive mode of inheritance. Ultrastructural studies showed a split in the epidermis-dermis below the lamina densa (LD) and the

[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/339659/poa-ppr-china-20140514.pdf Accessed 25/10/2015

[4] http://ahvla.defra.gov.uk/documents/surveillance/diseases/bovine-besnoitiosis.pdf Accessed 25/10/2015

collagen fibrils that help to attach the LD to the dermis were abnormal. This is the first case of EB described in a goat.

INFECTION

Spyrou and Valiakos (2015) published a review of orf virus infection in sheep and goats. They comment that infection may be associated with more severe signs in goats compared with sheep. Some members of the audience had diagnosed orf in goats although in some cases this was primarily diagnosed through the clinical presentation rather than submission of crust material for EM or skin biopsy histopathological findings.

ECTOPARASITES

A questionnaire survey of ectoparasites in goat herds in the UK (mainly England and Wales) showed that many goat keepers had reported, in the previous 12 months, lice (23%) and mange (19%) problems. Demodicosis, scabies and psoroptic mange were rarely reported. Many owners relied on macrocyclic lactones, especially ivermectin, to control ectoparasites. Chorioptic mange remains a major challenge for some owners so the following section is an update on the text published in the journal in 2010.

CHORIOPTIC MANGE

This form of mange is due to a surface dwelling mite called *Chorioptes* which resembles morphologically those seen on cattle; it is likely that all livestock carry *C. bovis,* although *C. texanus* also exists.

Management of chorioptic mange can be difficult because these mites can survive off the host for up to three weeks in the environment, many infested animals are not severely affected and so act as a reservoir. Some goats may be particularly susceptible to infestation and develop a severe hypersensitivity response leading to significant self trauma (pruritus) and clinical signs. Evidence of infestation is usually apparent on the caudal aspect of the distal limbs with alopecia, erythema and crusting.

Diagnosis can sometimes be difficult in severely affected cases and it is worth clipping away normal hair from the margin of the lesioned areas in order to collect superficial skin scrapings for microscopic examination from the leading edge of the lesioned skin, to find the characteristic mites with their short wine-shaped pedicels.

Consideration should be given to the management of the environment in housed goats and this may include attention to disposal of bedding; however, most of the mites will be on the goats and a whole group should be treated with accurate data on the body weight where systemic treatments are being given.

Topical therapies are important for these surface dwelling mite and these may include fipronil-based sprays (once a month) and selenium sulphide shampoos (applied every other week). Lime sulphur has been used for ectoparasite control in a variety of species and although it may smell and stain surfaces, the dip formulation is safe and can be used weekly (LimePlus Equine dip™; Dechra, UK). There are likely to be a variety of topical therapies applied on an empirical basis, such as topical macrocyclic lactone (MLs) products mixed with DMSO (Dimethyl sulfoxide) as a solvent to promote absorption. Topical treatments should be pursued for up to two mite life cycles – i.e. up to 6 weeks.

Systemic treatments based on MLs have been the mainstay of treatment for large numbers of goats; consideration must always be given to the use of such product in milking goats because of the long milk with-holding periods and the potential impact on enteric parasites notably nematodes for grazing goats. Eprinomectin pour-on has been shown to be effective in goats for the treatment of

endoparasites at a dose of 1 mg / kg (Hamel and others 2015) and this will become a licensed product in due course. With a milk with-holding period of 7 days this product will also be useful for helping to control ectoparasites such as Chorioptes mites and lice.

Topical application of licensed MLs can be problematic; drug absorption may be influenced by degradation on the surface of the skin or it is trapped within skin surface layers. Generally all MLs have shown limited efficacy for the control of *Chorioptes* mites in goats.

One should consider a combination of topical and systemic therapies where practical – although large dairy goat groupings may prohibit this approach with respect to regular topical applications. In severely affected animals it may be prudent to consider culling.

REFERENCES

Albani K et al. (2014) Lice infestation in goats in western Santa Catarina, Brazil. Comparative Clinical Pathology 23: 475-476.

Anzuino K et al. (2010) Assessment of welfare on 24 commercial UK dairy goat farms based on direct observations. Veterinary Record 167: 774-780.

Cornall K and Wall R (2015) Ectoparasites of goats in the UK. Veterinary Parasitology 207: 176-179.

Hamel D. et al. (2015) Anthelmintic efficacy and pharmacokinetics of pour-on eprinomectin (1 mg/kg bodyweight) against gastrointestinal and pulmonary nematode infections in goats. Small Ruminant Research 127: 74-79.

Medeiros GX et al. (2013) Dystrophic epidermolysis bullosa in goats. Journal of Comparative Pathology 148: 354-360.

Medeiros GX and Riet-Correa F. (2015) Epidermolysis bullosa in animals: a review. Veterinary Dermatology 26: 3-13, e1-2.

Muri K et al. (2013) Development and testing of an on-farm welfare assessment protocol for dairy goats. Animal Welfare 22: 385-400.

Oryan A et al. (2014) Caprine besnoitiosis: an emerging threat and its relationship to some other infections of ungulates by Besnoitia species. Research in Veterinary Science 97: 1-7.

Parida S et al. (2015) Peste des petits ruminants. Veterinary Microbiology doi: 10.1016/j.vetmic.2015.08.009.

Spyrou V and Valiakos G. (2015) Orf virus infection in sheep or goats. Veterinary Microbiology doi: 10.1016/j.vetmic.2015.08.010.